

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A producing method of a semiconductor device, comprising:
film thinning a silicon oxide film of gate insulating film by heating the silicon oxide film formed after a surface of a silicon substrate is etched by chemical liquid, and
one of thermal oxidizing by heating the thinned silicon oxide film to oxidize the silicon oxide film by gas including at least oxygen, and plasma oxidizing the thinned silicon oxide film by plasma discharged gas including at least oxygen.
2. (Previously presented) A producing method of a semiconductor device as recited in claim 1, wherein in the film thinning step, the silicon oxide film formed after the etching is carried out is processed at 800°C or higher.
3. (Previously presented) A producing method of a semiconductor device as recited in claim 2, wherein in the film thinning step, the silicon oxide film formed after the etching is carried out is processed at 800°C to 1000°C.
4. (Previously presented) A producing method of a semiconductor device as recited in any one of claims 1 to 3, wherein
in the film thinning, the silicon oxide film formed after the etching is carried out is processed under a reduced pressure in nitrogen atmosphere.
5. (Previously presented) A producing method of a semiconductor device as recited in claim 4, wherein the reduced pressure is 266 Pa to 2660 Pa.
6. (Previously presented) A producing method of a semiconductor device as recited in claim 4, wherein in the film thinning step, the silicon oxide film formed after the etching is carried out is processed by nitrogen.
7. (Previously presented) A producing method of a semiconductor device as

recited in claim 6, wherein in the film thinning step, the silicon oxide film formed after the etching is carried out is processed for 5 seconds to 60 seconds.

8. (Previously presented) A producing method of a semiconductor device as recited in any one of claims 1 to 3, further comprising:

plasma nitriding the silicon oxide film by plasma discharged gas including at least nitrogen to form a silicon oxynitride film, wherein

a dose amount of nitrogen of the silicon oxynitride film is made to be 1×10^{15} [atoms/cm²] or higher by the plasma nitriding.